IN THE CLAIMS

1. **(currently amended)** Transmitting apparatus which transmits a data signal to a receiving apparatus via at least two different transmission paths, comprising:

an antenna array;

a transmitter array connected to the antenna array;

a plurality of adders connected to the transmitter array; and

a plurality of beamformers connected to the ~~transmitter array~~adders, each beam former being configured to operate under control of a weight control unit, which receives angle of arrival signals being estimates of the angles of arrival of signals received from the receiving apparatus, and being configured to receive a respective transmission signal representing a same data signal and to modify the respective transmission signal by splitting the signal into a plurality of separate signals, and multiplying each signal by a complex value being a beamformer weight to form a plurality of digital baseband signals, which are added to the corresponding outputs of the other beamformers in the adders, such that the antenna array produces a plurality of directional transmission beams carrying respective transmission signals which are transmitted via different transmission paths to the receiving apparatus; and

a space-time encoder which applies respectively different space-time coding to the same data signal thereby to produce space-time encoded transmission signals for transmission by the respective transmission beams.

2. (previously presented) Apparatus according to claim 1 wherein the space-time encoder is arranged to transmit an item of data in different transmission beams at different times.

3. (original) Apparatus according to claim 1 wherein the space-time encoder is arranged such that a first transmission signal comprises two sequential symbols and a second transmission signal comprises the two symbols in reverse order.

4. (original) Apparatus according to claim 3 wherein one of the symbols in one of the transmission signals is the complex conjugate of the corresponding symbol in the other transmission signal, and one of the symbols in one of the transmission signals is the inverse of the complex conjugate of the corresponding symbol in the other transmission signal.

5. **(currently amended)** Receiving apparatus which receives a plurality of transmission signals and outputs a combined signal based on the plurality of transmission signals, comprising:

a receiver configured to receive a plurality of transmission signals representing a same data signal carried in respective directional transmission beams via respective transmission paths, and to separate the plurality of transmission signals; and

a space-time decoder which is configured to decode the transmission signals which have been differently space-time coded by respective space-time coding,

wherein the space-time decoder comprises a channel estimator which estimates channel vectors of the transmission paths and which estimates channel vectors of interference paths from one transmission path to another, and a combiner which combines the received transmission signals with the channel vectors estimated by the channel estimator to yield an output signal.

6. **(canceled)**

7. (previously presented) Transmitting apparatus which transmits a data signal to a receiving apparatus via at least two different transmission paths, comprising:

an antenna array;

a transmitter array connected to the antenna array;

a plurality of beamformers connected to the transmitter array, each beam former being configured to receive a respective transmission signal representing a same data signal and to modify the respective transmission signal, such that the antenna array produces a plurality of directional transmission beams carrying respective transmission signals which are transmitted via different transmission paths to the receiving apparatus; and

a plurality of channel encoders, each channel encoder being configured to encode the same data signal according to a different channel code, thereby to produce the transmission signals for transmission by the respective transmission beams.

8. (previously presented) Apparatus according to claim 7 wherein the channel encoders code the data signals such that cross-correlation between the transmission signals is lower than the cross-correlation between transmission signals when different channel encoding is not employed.

9. (previously presented) Apparatus according to claim 7 wherein the channel encoders apply different error protection codes to the transmission signals.

10. (original) Apparatus according to claim 7 wherein the coding applied by the channel encoders is at least one of convolution coding, turbo coding, block coding and interleaving.

11. (previously presented) Receiving apparatus which receives a plurality of transmission signals and outputs a combined signal based on the plurality of transmission signals, comprising:

a receiver configured to receive the plurality of transmission signals representing a same data signal carried in respective directional transmission beams via respective transmission paths, and to separate the plurality of transmission signals;

a plurality of channel decoders each of which decodes one of the transmission signals which has been channel encoded differently from the other transmission signals; and

a combiner which combines signals decoded by the channel decoders to yield the output signal.

12. (previously presented) Apparatus according to claim 11 wherein the channel decoders decode signals which have been coded using different error protection codes.

13. (previously presented) Apparatus according to claim 11 wherein the channel decoders decode signals which have been coded using at least one of different turbo codes, different convolution codes, different block codes and different interleaving.

14. (withdrawn from consideration) Transmitting apparatus which transmits a data signal to a receiving apparatus, comprising:

an antenna array;

a transmitter array connected to the antenna array;

a plurality of beam formers connected to the transmitter array, each beam former being operable to receive a transmission signal and to modify the transmission signal, such that the antenna array produces a plurality of directional transmission beams carrying

respective transmission signals which are transmitted via different transmission paths to the receiving apparatus;

a receiver operable to receive from the receiving apparatus a feedback signal indicating a quality of the transmission beams; and

a processor programmed to select at least one of the plurality of transmission beams based on the feedback signal and to insert the data signal only in those transmission signals which correspond to the selected transmission beams.

15. (withdrawn from consideration) Apparatus according to claim 14 wherein the processor is programmed to determine whether the transmission beams have faded and to select transmission beams which are not faded.

16. (withdrawn from consideration) Apparatus according to claim 15 wherein the processor is programmed to select transmission beams additionally based on the relative powers of the transmission beams.

17. (withdrawn from consideration) Apparatus according to claim 15 wherein the processor is programmed to select transmission beams additionally based on the directions of the transmission beams.

18. (withdrawn from consideration) Apparatus according to claim 14 wherein the processor is programmed to transmit a control signal in a transmission beam which is not selected, which control signal is for use in measuring the quality of the transmission beam.

19. (withdrawn from consideration) Apparatus according to claim 14 wherein the feedback signal comprises a number of feedback symbols equal to the number transmission beams, and each feedback symbol indicates whether one of the transmission beams has faded.

20. (withdrawn from consideration) Apparatus according to claim 14 wherein the feedback signal comprises measures of the quality of each of the transmission beams.

21. (withdrawn from consideration) Apparatus according to claim 20 wherein the receiver is arranged to receive the quality measures for different transmission beams at different times on a predetermined time division multiplexing basis.

22. (withdrawn from consideration) Apparatus according to claim 14 wherein the processor is programmed to alter signals to be carried by the transmission beams such that the transmission beams are distinguishable from each other.

23. (withdrawn from consideration) Transmitting apparatus which transmits a plurality of transmission signals, comprising:

an antenna array;

a transmitter array connected to the antenna array;

a plurality of beam formers connected to the transmitter array, each beam former being operable to receive a transmission signal and to modify the transmission signal, such that the antenna array produces a plurality of directional transmission beams carrying respective transmission signals; and

a processor programmed to adjust the relative timing of at least two transmission signals such that, when the corresponding transmission beams are received at a receiving

apparatus via different transmission paths the two transmission signals are substantially in time synchronism.

24. (withdrawn from consideration) Apparatus according to claim 23 wherein the processor is programmed to adjust the relative timing of the two transmission signals in dependence on a measure of the relative propagation delay of the corresponding transmission paths.

25. (withdrawn from consideration) Apparatus according to claim 24 wherein the processor is programmed to measuring the relative propagation delay of the transmission paths.

26. (withdrawn from consideration) Apparatus according to claim 24 wherein the processor is programmed to receive the measure of the relative propagation delay from the receiving apparatus.

27. (withdrawn from consideration) Apparatus according to claim 23 wherein the two transmission signals both comprise a signal to be transmitted to the receiving apparatus.

28. (withdrawn from consideration) Apparatus according to claim 23 wherein one transmission signal comprises a signal to be transmitted to the receiving apparatus and the other transmission signal comprises a signal to be transmitted to a different receiving apparatus.

29. (withdrawn from consideration) Apparatus according to claim 23 wherein the processor is programmed to select transmission signals which are to have their relative timing adjusted based on the directions of the corresponding transmission beams.

30. (withdrawn from consideration) Apparatus according to claim 23 wherein the processor is programmed to select transmission signals which are to have their relative timing adjusted based on the relative powers of the corresponding transmission beams.

31. (withdrawn from consideration) Apparatus according to claim 23 further comprising two orthogonal coders which apply at least one of orthogonal spreading codes and orthogonal scrambling codes to the two transmission signals.

32. (withdrawn from consideration) Receiving apparatus which receives signals transmitted by a transmitting apparatus, comprising:

a receiver which receives a plurality of directional transmission beams transmitted from the transmitting apparatus via different transmission paths, each transmission beam carrying a transmission signal;

a processor programmed to measure a relative propagation delay of the transmission signals and to produce a feedback signal based on a measure of the relative propagation delay; and

a transmitter which transmits the feedback signal from the receiving apparatus to the transmitting apparatus.

33. **(currently amended)** Transmitting apparatus for transmitting a data signal to a receiving apparatus via at least two different transmission paths, comprising:

operating means for operating each of a plurality of beamformers under control of a weight control unit, which receives angle of arrival signals being estimates of the angles of arrival of signals received from the receiving apparatus;

configuring means for configuring each beamformer to receive a respective transmission signal representing a same data signal and modifying the respective transmission signal by splitting the signal into a plurality of separate signals, and multiplying each signal by a complex value being a beamformer weight to form a plurality of digital baseband signals;

adding means for adding the plurality of digital baseband signals to the corresponding outputs of the other beamformers using a plurality of adders;

passing means for passing the outputs of the adders to a transmitter array connected to an antenna array;

producing means for producing, using the antenna array, a plurality of directional transmission beams carrying respective transmission signals which are transmitted via different transmission paths to the receiving apparatus;

space-time encoding means for applying respectively different space-time encoding to the same data signal thereby to produce ~~a plurality of~~ space-time encoded transmission signals ~~representing a same data signal; and~~

~~transmitting means for transmitting the plurality of space-time encoded transmission signals to the receiving apparatus via different transmission paths in~~for transmission by the respective ~~directional~~ transmission beams.

34. **(currently amended)** Receiving apparatus for receiving a plurality of space-time encoded transmission signals and outputting a combined signal based on the plurality of transmission signals, comprising:

receiving means for receiving the plurality of transmission signals representing a same data signal carried in respective directional transmission beams via respective transmission paths; ~~and~~

separating means for separating the plurality of signals;

decoding means for space-time decoding the plurality of transmission signals which have been space-time encoded by respectively different space-time coding, wherein the decoding means comprises estimating means for estimating channel vectors of the transmission paths and estimating channel vectors of interference paths from one transmission path to another, and combining means for combining the received transmission signals with the estimated channel vectors to yield an output signal.

35. (previously presented) Transmitting apparatus for transmitting a data signal to a receiving apparatus via at least two different transmission paths, comprising:

channel encoding means for encoding the data signal according to a plurality of different channel codes, thereby to produce a plurality of transmission signals representing a same data signal encoded according to different channel codes; and

transmitting means for transmitting the plurality of transmission signals to the receiving apparatus via different transmission paths in respective directional transmission beams.

36. (previously presented) Receiving apparatus for receiving a plurality of transmission signals and outputting a data signal based on the plurality of transmission signals, comprising:

receiving means for receiving the plurality of transmission signals representing a same data signal carried in respective directional transmission beams via respective transmission paths;

decoding means for decoding the transmission signals, each of the transmission signals having been encoded according to a different channel code; and

combining means for combining signals decoded by the decoding means to yield the data signal.

37. (withdrawn from consideration) Transmitting apparatus for transmitting a data signal to a receiving apparatus, comprising:

transmitting means for transmitting a plurality of directional transmission beams to the receiving apparatus via different transmission paths;

receiving means for receiving from the receiving apparatus a feedback signal indicating a quality of the transmission beams; and

selecting means for selecting at least one of the plurality of transmission beams based on the feedback signal;

wherein transmitting means is arranged to transmit the data signal only in those transmission beams selected by the selecting means.

38. (withdrawn from consideration) Transmitting apparatus for transmitting a plurality of transmission signals, comprising:

transmitting means for transmitting a plurality of directional transmission beams, each transmission beam carrying a transmission signal; and

time adjusting means for adjusting the relative timing of at least two transmission signals such that, when the corresponding transmission beams are received at a receiving

apparatus via different transmission paths the two transmission signals are substantially in time synchronism.

39. (withdrawn from consideration) Receiving apparatus for receiving signals transmitted by a transmitting apparatus, comprising:

receiving means for receiving a plurality of directional transmission beams transmitted from the transmitting apparatus via different transmission paths, each transmission beam carrying a transmission signal;

means for measuring a relative propagation delay of the transmission signals;

means for producing a feedback signal based on a measure of the relative propagation delay; and

means for transmitting the feedback signal from the receiving apparatus to the transmitting apparatus.

40. **(currently amended)** A method of transmitting a data signal from a transmitting apparatus to a receiving apparatus via at least two different transmission paths, comprising:

operating each of a plurality of beamformers under control of a weight control unit, which receives angle of arrival signals being estimates of the angles of arrival of signals received from the receiving apparatus;

configuring each beamformer to receive a respective transmission signal representing a same data signal and modifying the respective transmission signal by splitting the signal into a plurality of separate signals, and multiplying each signal by a complex value being a beamformer weight to form a plurality of digital baseband signals;

adding the plurality of digital baseband signals to the corresponding outputs of the other beamformers using a plurality of adders;

passing the outputs of the adders to a transmitter array connected to an antenna array;

producing, using the antenna array, a plurality of directional transmission beams carrying respective transmission signals which are transmitted via different transmission paths to the receiving apparatus;

applying respectively different space-time encoding to the same data signal thereby to produce ~~a plurality of~~ space-time encoded transmission signals ~~representing a same data signal ; and~~

~~transmitting the plurality of space-time encoded transmission signals to the receiving apparatus via different transmission paths in~~for transmission by the respective ~~directional~~ transmission beams.

41. **(currently amended)** A method of receiving a plurality of space-time encoded transmission signals and outputting a combined signal based on the plurality of transmission signals, comprising:

receiving the plurality of transmission signals representing a same data signal carried in respective directional transmission beams via respective transmission paths; ~~and~~

separating the plurality of signals;

space-time decoding the plurality of transmission signals which have been space-time encoded by respectively different space-time coding, wherein space-time decoding comprises estimating channel vectors of the transmission paths and estimating channel vectors of interference paths from one transmission path to another; and

combining the received transmission signals with the estimated channel vectors to yield an output signal.

42. (previously presented) A method of transmitting a data signal from a transmitting apparatus to a receiving apparatus via at least two different transmission paths, comprising:

encoding the data signal according to a plurality of different channel codes, thereby to produce a plurality of transmission signals representing a same data signal encoded according to different channel codes; and

transmitting the plurality of transmission signals to the receiving apparatus via different transmission paths in respective directional transmission beams.

43. (previously presented) A method of receiving a plurality of transmission signals and outputting a data signal based on the plurality of transmission signals, comprising:

receiving the plurality of transmission signals representing a same data signal carried in respective directional transmission beams via respective transmission paths;

decoding the transmission signals, each of the transmission signals having been encoded according to a different channel code; and

combining the thus decoded signals to yield the data signal.

44. (withdrawn from consideration) A method of transmitting a data signal from a transmitting apparatus to a receiving apparatus, comprising:

transmitting a plurality of directional transmission beams from the transmitting apparatus to the receiving apparatus via different transmission paths;

receiving the plurality of directional transmission beams;

producing measures of a quality of the transmission beams;

producing a feedback signal based on the measures of the quality of the transmission beams;

transmitting the feedback signal from the receiving apparatus to the transmitting apparatus;

receiving the feedback signal;

selecting at least one of the plurality of transmission beams based on the feedback signal; and

transmitting the data signal only in the selected transmission beams.

45. (withdrawn from consideration) A method of transmitting a plurality of transmission signals, comprising:

adjusting the relative timing of at least two transmission signals; and

transmitting a plurality of directional transmission beams, each transmission beam carrying a transmission signal;

wherein the relative timing of the at least two transmission signals is adjusted such that, when the corresponding transmission beams are received at a receiving apparatus via different transmission paths the two transmission signals are substantially in time synchronism.